

Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims

1-14. (Canceled)

15. (Currently Amended) A lens control apparatus comprising:

a movable part which is movable along an optical axis for performing focus adjustment;

an actuator ~~for driving~~ which drives said movable part;

a position-of-movable-part detecting means unit ~~for detecting~~ which detects a position of said movable part;

a focus control means unit ~~for determining~~ which determines a state of focus and ~~supplying~~ supplies a driving signal which causes said movable part to move toward an in-focus position, according to the determined state of focus; and

a position control means unit ~~for performing~~ which performs position control of said movable part via said actuator by updating the driving signal by a plurality of times during ~~predetermined time~~ a vertical synchronizing period ~~so that an average moving speed of said movable part during the predetermined time period becomes a predetermined speed.~~

16. (Currently Amended) A lens control apparatus according to claim 15, wherein said actuator is a linear motor, and said position control means updates a target position n times during the ~~predetermined time~~ vertical synchronizing period by an amount of movement, s/n, at

a time with respect to an amount of movement, s , by which said movable part moves at the predetermined speed, and uses a driving signal corresponding to the updated target position as the driving signal to be supplied to said linear motor by said focus control means.

17. (Original) An image pickup apparatus comprising:

image pickup means including a lens and an image pickup element;

an actuator for moving a movable part along an optical axis defined by the lens and the image pickup element, said movable part being either one of the lens and the image pickup element;

position-of-movable-part detecting means for detecting a position of said movable part;

extracting means for extracting a focus voltage signal from an output signal of said image pickup means; and

focus control means for determining whether a state of focus is an in-focus state, according to a signal level of the focus voltage signal extracted by said extracting means, and supplying a driving signal which causes said movable part to move toward an in-focus position, to said actuator according to the determined state of focus,

said focus control means including:

first control means for calculating a target position to which said movable part is made to move, on a first control cycle according to the signal level of the focus voltage signal extracted by said extracting means; and

second control means for updating the driving signal to be supplied to said actuator, on a second control cycle,

said second control means executing updating of the driving signal on the second control cycle so that an average moving speed at which said movable part continues to move until said movable part reaches the target position calculated by said first control means becomes a predetermined speed, as well as so that said movable part gradually approaches the target position until said movable part reaches the target position.

18. (Original) An image pickup apparatus according to claim 17, wherein said actuator is a linear motor, and said second control means includes selecting means for selecting, according to a positional difference between the target position calculated by said first control means and a current position of said movable part, control for forcedly updating the driving signal to be supplied to said linear motor with a driving signal corresponding to the target position or control for updating the driving signal to be supplied to said linear motor with a driving signal which causes said movable part to gradually approach the target position.

19. (Original) An image pickup apparatus according to claim 15 or 17, wherein the predetermined speed varies according to the signal level of the focus voltage signal or the determined state of focus.

20-25. (Canceled).

26. (Currently Amended) A method of controlling an image pickup apparatus, comprising the steps of:

causing an actuator to move a movable part along an optical axis defined by a lens and an image pickup element, said movable part being either one of the lens and the image pickup element;

determining a state of focus; and

performing position control of said movable part so that said movable part moves toward an in-focus position, according to the determined state of focus,

a driving signal for moving said movable part being given to said actuator while being updated by a plurality of times during a ~~predetermined time~~ vertical synchronizing period so that an average moving speed of said movable part during the ~~predetermined time period~~ becomes a ~~predetermined speed~~.

27. (Currently Amended) A method of controlling an image pickup apparatus according to claim 26, wherein said actuator is a linear motor, and the driving signal which is given to said linear motor while a target position is being updated n times during the ~~predetermined time~~ vertical synchronizing period by an amount of movement, s/n , at a time with respect to an amount of movement, s , by which said movable part moves at the predetermined speed is used as a driving signal corresponding to the updated target position.

28. (Original) A method of controlling an image pickup apparatus, comprising the steps of:

causing an actuator to move a movable part along an optical axis defined by a lens and an image pickup element, said movable part being either one of the lens and the image pickup element;

determining whether a state of focus is an in-focus state, according to a signal level of a focus voltage signal obtained from an output signal of the image pickup element; and

performing position control of said movable part so that said movable part moves toward an in-focus position, according to the determined state of focus,

a target position to which said movable part is made to move according to the signal level of the focus voltage signal being calculated on a first control cycle, and the driving signal to be given to said actuator being updated on a second control cycle so that an average moving speed at which said movable part continues to move until said movable part reaches the calculated target position becomes a predetermined speed, as well as so that said movable part gradually approaches the target position until said movable part reaches the target position.

29. (Original) A method of controlling an image pickup apparatus according to claim 28, wherein said actuator is a linear motor, said method further comprising the step of selecting, according to a positional difference between the target position calculated on the first control cycle and a current position of said movable part, control for forcedly updating the driving signal to be given to said linear motor with a driving signal corresponding to the target position or control for updating the driving signal to be given to said linear motor with a driving signal which causes said movable part to gradually approach the target position.

30. (Original) A method of controlling an image pickup apparatus according to claim 26 or 28, wherein the predetermined speed varies according to the signal level of the focus voltage signal or the determined state of focus.

31- 36. (Canceled).

37. (Currently Amended) A lens control apparatus comprising:

a movable part which is movable along an optical axis for performing focus adjustment;

an actuator ~~for driving~~ which drives said movable part;

a position-of-movable-part detecting means unit ~~for detecting~~ which detects a position of said movable part;

a focus control means unit ~~for determining~~ which determines a state of focus and ~~supplying supplies to said actuator a driving signal which causes~~ said movable part to move toward an in-focus position, according to the determined state of focus; and

a position control means unit ~~for performing~~ which performs position control of said movable part via said actuator by updating the driving signal by a plurality of times during a ~~predetermined time~~ vertical synchronizing period so that an average moving speed of said movable part during the ~~predetermined time~~ vertical synchronizing period becomes a predetermined speed.

38. (Currently Amended) A lens control apparatus according to claim ~~38~~ 37, wherein said actuator is a linear motor.

39. (Original) A lens control apparatus according to claim 37, further comprising image pickup means, said focus control means determining the state of focus by extracting a predetermined focus signal which varies according to the state of focus, from a picked-up image signal outputted from said image pickup means.

40. (Currently Amended) A lens control apparatus according to claim 37, wherein said position control means updates a target position n times during the ~~predetermined time~~ vertical synchronizing period by an amount of movement, s/n , at a time with respect to an amount of movement, s , by which said movable part moves at the predetermined speed, and uses a driving signal corresponding to the updated target position as the driving signal to be supplied to said linear motor by said focus control means.